

REMARKS

This is in response to the Office Action of October 1, 2007. Claims 1-6 are pending in the present application. All of the claims are amended to refer to the thermosetting polyimide embodiments of the present invention. Claim 1 is also amended to recite quantitative parameters recited in original claims 2 and 3, and claims 2 and 3 are amended accordingly. No new matter is introduced by this Amendment. Entry of this Amendment, in order to place the application into condition for allowance or into better condition for appeal, is earnestly solicited.

The invention

This invention relates to powdered cores, which are made by compacting iron powder containing electrically insulating binder resin to form green compacts. The iron powder particles are not combined metallurgically. Instead, they are joined together by the binder resin. In general, powdered cores of this type are not very strong. As discussed in the "Background Art" section of the specification, cracking or chipping are liable to occur when such cores are subjected to machining or drilling processes.

The present invention specifies a particular type of iron powder (iron powder composed of atomized iron powder and reduced iron powder) to make the presently claimed powdered cores, which provides the powdered cores with good strength properties. As discussed for instance in lines 22-26 on page 13 of the specification, the use of binder resins containing thermosetting polyimide resins in accordance with the present invention provides powdered cores which have improved machinability, improved magnetic flux density, and decreased iron loss.

Rejection over prior art

Claims 1-6 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over US 5,767,426 ("Oliver") in view of US 2002/0029657 ("Uenosono") and US 4,543,208 ("Horie"). Office Action, pages 2-4. The rejection is respectfully traversed.

The Examiner admits that the primary reference, Oliver, differs from the present invention with respect to (a) the iron powder composed of atomized iron powder and reduced iron powder, and (b) the use of polyimide-type resins as an organic insulating material and binder. The Examiner argues, however, that feature (a) is provided by Uenosono and that feature (b) is provided by Horie. As discussed in the Amendment filed July 6, 2007, Applicants respectfully disagree that Uenosono and Horie remedy the acknowledged deficiencies of the Oliver reference.

However, even if the combination of references proposed by the Examiner were to be considered to raise a *prima facie* case of obviousness against the present invention, that *prima facie* case is rebutted by evidence of record.

As noted by the Examiner, Horie discloses that insulating binder resin can be a thermosetting or thermoplastic resin and Horie provides a listing of such resins including polyimide resins. Therefore, according to the Examiner, it is obvious to substitute the polymeric compounds taught by Horie for the polymeric compound of Oliver. The Examiner contends that substituting a thermosetting or thermoplastic polyimide from among the well known insulating binder resins taught by Horie for the polymer material of Oliver is within the skill of the art and is therefore *prima facie* obvious.

However, Applicants have discovered that the resins taught generically by Horie are not equivalent to one another in the context of the present invention. Specifically, Applicants have discovered that the “the preferable content of reduced iron powder is in the range of 5 to 50% and thermosetting PI is in the range of 0.10 to 0.15% in order to obtain powdered cores having improved machinability, 1.8 T or more of magnetic flux density and 3000 kW/m³ or less of iron loss.” Specification, page 13, lines 22-26. Thus, thermosetting polyimides are not in fact equivalent to all of the other resins listed by Horie, because thermosetting polyimides provide powdered cores which have unexpected beneficial properties.

Nothing in the combined teachings of Oliver, Uenosono, and Horie suggests that Applicants’ combination of a reduced iron powder content in the range of 5 to 50% and a

thermosetting polyimide content in the range of 0.10 to 0.15% would be expected to provide powdered cores having improved machinability, along with a magnetic flux density of 1.8 T or more and an iron loss rating of 3000 kW/m³ or less. Accordingly, even if the Examiner is considered to have established a *prima facie* case of obviousness – by judiciously correlating various features of Applicants' invention to isolated aspects of technology found in the diverse Oliver, Uenosono, and Horie references – Applicants evidence of unexpected beneficial properties clearly rebuts the *prima facie* case of obviousness.

The rejection of record should be withdrawn, and this application should be passed to Issue.


Contact information

If there are any questions concerning this application, the Examiner is invited to contact Richard Gallagher, Registration No. 28,781, at (703) 205-8008.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37.C.F.R. §§1.16 or 1.14; particularly, extension of time fees.

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Respectfully submitted,

By 

Marc S. Weiner

Registration No.: 32,181

BIRCH, STEWART, KOLASCH & BIRCH, LLP

8110 Gatehouse Road

Suite 100 East

Falls Church, Virginia 22040-0747

(703) 205-8000

Attorney for Applicant